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23494 7590 04/10/2007 TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			EXAMINER HERNANDEZ, WILLIAM	
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**GROUP 2800**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/779,903  
Filing Date: February 17, 2004  
Appellant(s): ZHOU ET AL.

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Carlton H. Hoel  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 12/11/2006 appealing from the Office action mailed 07/07/2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

This appeal involves claims 2-26.

Claims 1 and 24 have been canceled.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

Applicant's Figs. 1 and 2

Jung (USPAP 2005/0217885)

Rapp (USP 5,280,420)

Verhaeghe et al. (USP 5,479,132)

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-23, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art depicted by Applicant's Figs. 1-2 in view of Verhaeghe et al. (USP 5,479,132) or Rapp (USP 5,280,420) or Jung (USPAP 2005/0217885).

The prior art discloses in Fig. 2 a conventional two-channel acquisition system including:

**Regarding claim 2:**

an input conductor ( $I_{in}$ ), a first amplifier stage (11), a second amplifier stage (13), an integrating capacitor (CINT).

However, the prior art does not specifically disclose "an MOS compensation capacitor" as recited in claim 2.

Verhaeghe teaches in Figs. 4B and 4C the well-known diagrams of capacitor-connected transistors that are used as capacitors. These types of capacitors are seen to be functionally equivalent, that is, they are both well known capacitor type. It would

have been obvious to one of ordinary skill in the art at the time the invention was filed to substitute one well-known capacitor for another. For example, substitute  $C_C$  of prior art with the capacitor connected transistor as shown in figs. 4b-4c of Verhaeghe.

The same motivation applied to Verhaeghe's reference is applied to Rapp or Jung's references. These implementations are preferred because MOS transistors are more efficiently implemented in silicon than capacitors and diodes with unconstrained terminals (see col. 7, lines 10-16 of Rapp) or (see fig. 3 of Jung).

**Regarding claim 3:** the limitation recited is inherently seen in the prior art Fig. 2.

**Regarding claim 4:** because the claimed structure is fully met by the prior art, the recited function will necessarily be inherent in the prior art, Fig. 2, as held by the court in *In re Best*, 195 USPQ 430.

**Regarding claim 5:** the input current ( $I_{in}$ ) is a photodiode current. Moreover, because the claimed structure is fully met by the prior art, the recited function will necessarily be inherent in the prior art, Fig. 2, as held by the court in *In re Best*, 195 USPQ 430.

**Regarding claim 6:** the first amplifier stage is a non-inverting amplifier stage (11) and the second amplifier stage is an inverting amplifier stage (13).

**Regarding claim 7:** the same motivation applied to claim 2 is applied to the limitation "the MOS compensation capacitor".

**Regarding claim 8:** the integrating capacitor is a poly capacitor ( $C_{INT}$ ).

**Regarding claim 9:** the limitation "a single-ended input signal" is seen to define intended use. The front-end integrators of the prior art is capable of using a single-

ended input signal as recited In re Tuominen, 213 USPQ 89 (CCPA 1982) & In re Pearson, 494 F.2d 1399, 181 USPQ 641 (CCPA 1974).

**Regarding claim 10:** the input of the first amplifier (11) conducts a differential input signal.

**Regarding claim 11:** the second stage amplifier (13) is an inverting class A amplifier.

**Regarding claim 12:**

a plurality of integrator circuits (2A-1, 2A-2, 2B-1, 2B-2), each including: an input conductor ( $I_{in}$ ), a first amplifier stage (11), a second amplifier stage (13), an integrating capacitor ( $C_{INT}$ ). The same motivation applied to claim 2 regarding "an MOS compensation capacitor" is applied to claim 12.

a plurality of photodiodes (D-1, D-2);

a plurality of analog-to-digital converters (elements 2-1 - 2-N/2 of Fig. 1).

**Regarding claims 13-15:** these claims are similarly rejected as claims 3-5.

**Regarding claim 16:** the analog-to-digital converter is delta-sigma analog-to-digital converters (15).

**Regarding claim 17:** the input of the analog-to-digital converter (15) is coupled to common outputs (14) of groups of the integrator circuits (2A-1, 2A-2, 2B-1, 2B-2), respectively.

**Regarding claims 18-23:** these claims are similarly rejected as claims 6-11.

**Regarding claims 25 and 26:** the methods recited in these claims are similarly rejected as claims 2 and 12, respectively.

**(10) Response to Argument**

Claims 2-11:

(I) Appellant argues that prior art Fig. 2 does not suggest a MOS capacitor because MOS capacitors have a non-linear voltage dependent capacitance and are noisy. That may be true, but that does not discount the benefit of more efficient implementation in silicon taught by Rapp or the smaller occupying area size taught by Tobita (USP 5,544,102; col. 7: 44-49). The combining of references does not necessarily have to be devoid of drawbacks as long as the motivation for combining brings about at least one desired benefit.

(II) Appellant's argument that Verhaeghe's capacitor 14 in Fig. 1 is not a feedback compensation capacitor in a two-amplifier-stage integrator as claimed does not address the actual figures used in the grounds of rejection. The figures that were relied upon in the grounds of rejection were Verhaeghe's Figs. 4B and 4C, which were used to demonstrate the equivalence in function between a discrete capacitor and a MOS capacitor and to show that it is old and well known in the art to substitute one for the other.

(III) Appellant's argument that Rapp's capacitors are used in charge pumps that do not need to avoid voltage dependant capacitance and do not suggest anything about the capacitors of the two-amplifier-stage integrator of claim 2 fails to realize that Rapp's reference was used as a teaching to suggest why one of ordinary skill in the art would want to change the capacitors in prior art Fig. 2 from one **type** to another, not to

teach their usage as per applicant's invention. This response applies to appellant's argument regarding the Jung reference as well.

Claims 12-23: Since claim 12 is a CT scanner with photodiode output signal integrators using the same integrators as in claim 2, the response to arguments regarding claim 2 apply here as well. Intended usage of the circuit as rejected in any device does not make it patentable.

Claim 25: Claim 25 is a method of operating the integrator of claim 2, and therefore, the foregoing response to arguments regarding claim 2 apply here as well.

Claim 26: Claim 26 is a method of operating the CT scanner of claim 12, and therefore, the foregoing response to arguments regarding claim 12 apply here as well.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

William Hernandez

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